

Viability Assessment Report For Southern Yellow Pine Habitat Association

Prepared by
Timothy O. Reed
Daniel Boone National Forest

I. Description of Habitat Association

The Southern Yellow Pine Habitat Association can be found to a limited degree throughout the Daniel Boone National Forest (DBNF). However, most of this association is located on the southern half of the national forest, excluding the Red Bird district. Over 92 percent of this habitat association is located on the London, Somerset and Stearns districts (USDA Forest Service, 1998). This association can be found in several land type associations (LTA) across the forest but the majority of occurrences are in the Southern Cliff (221Hc003), Rockcastle Hills (221Hc005), London-Corbin Plain (221Hc006) and Big South Fork Plateau (221Hc009) LTA (USDA Forest Service, 1997).

On the DBNF this habitat association occurs primarily on ridge tops and the upper half of slopes. However, depending on the dominant pines species and the site conditions, it may occur on lower portions of slopes and in drainages. Soils are variable but the ridgetop sites typically range from 5 to 40 inches in depth. Slopes typically have depths over 40 inches but sandstone outcrops and cliffclines are common. Some typical soil series include Rigley, Gilpin and Sequoia on the Ridges and Shelocta and Sequoia on the slopes. Most sites are moderately well drained (USDA Forest Service, 1997).

This association is dominated by an overstory of yellow pine species. On the DBNF these pine species most commonly include shortleaf, Virginia or pitch pine. These species also tend to occur on drier sites and are included in more xeric associations as mixed forest types. This association has an overstory yellow pine component that typically is at least 70 percent of the total overstory with the remainder composed of various hardwoods or other conifers. Other species that are typically found in the overstory of the Southern Yellow Pine Habitat Association include: scarlet oak, southern red oak, chestnut oak, white oak, black oak, blackgum, mockernut and pignut hickory, and red maple (Burns, 1990). Eastern hemlock and white pine may also occur as associates in some sites. Common understory associates include: dogwood, sourwood, sassafras, and red maple. *Vaccinium* species, *Gaylussacia* species and *Smilax* species are typical representatives of the herbaceous layer. Grasses such as bluestems, needlegrass, and broomsedge may occur in more open stands. Healthy stand structure in mature stands is ideally fairly open with overstory basal area (BA) of 60 to 80 square feet. This structure would benefit species that require large, mature trees and open midstory conditions. On the DBNF most of the mature representation of this association had a higher BA that usually falls in the 80 - 120 range (USDA Forest Service, 1998).

Disturbance has historically played a major role in creating and maintaining this association on the DBNF. Because this association is considered a sub-climax system, the amount of, and type of, disturbance is important to sustain the association. Past land uses in this association have included many types of disturbance activities such as logging for timber production, clearing for agriculture use, clearing for iron and charcoal production and clearing for settlement. However, fire is probably the single most important disturbance element in this association. Several researchers assert that fires have been essential to the development and perpetuation of pine forests in the southern Appalachians (Martin, 1991). On the DBNF, this association has been managed to some degree with prescribed fire over the last 15 – 20 years with increased acreage being managed in the last 5 years.

II. Current Status of the Habitat Association on the Daniel Boone National Forest

The DBNF has approximately 58,811 acres of forest area that is considered in the Southern Yellow Pine Habitat Association (USDA Forest Service, 1998). This represents over 8 percent of the total forested acres on the DBNF. Approximately 32 percent (18,655 acres) of this is greater than 70 years old. The age class less than 30 years old comprises approximately 40 percent (23,455 acres) of this association. On the DBNF this habitat association has historically been dominated by shortleaf and Virginia pine. Pitch pine stands only comprise about 2 percent (1,412 acres) of the total acreage for this association. However, pitch pine may be a component in stands labeled as either shortleaf or Virginia pine, but in acreage too small to be labeled as individual stands.

Much of this habitat contains high overstory BA and lacks grasses in the understory. In recent years this association was targeted for management by prescribed fire and hardwood midstory control for habitat improvements designed to benefit the endangered red-cockaded woodpecker (RCW). These activities occurred on the southern portions of the forest where existing RCW cluster sites or historical clusters occurred on the London, Somerset and Stearns districts.

Late in 1999 small infestations of Southern Pine Beetle (SPB) were documented on the Somerset and Stearns districts. By the summer of 2000 the SPB situation had turned critical and the forest experienced the worst outbreak of SPB that has ever been recorded in Kentucky. Efforts to control the epidemic were implemented by the forest but were largely ineffective. The problem continued into 2001 and currently continues to affect the remaining pines on the forest and throughout the state. Estimates as to the losses range from 75 to 90 percent for the total pine ecosystem with as much as 90 percent of the mature stands impacted by this epidemic. The devastation has been the most extensive in the southern portions of the forest where the greatest continuity of yellow pine habitat occurs.

This Southern Yellow Pine Habitat Association is currently in a state of devastation due to the SPB damage. Most of the pine overstory is either dead or infested. The SPB attack has destroyed yellow pine regeneration areas as young as 14 years old. Most of the pine regeneration younger than 12 to 14 years has survived. What currently remains is young regeneration and scattered pockets of mature and mid-aged habitat that are typically less than five acres in size.

III. Management Needs: Recommendations for the Conservation of Habitat to Ensure Species Viability

The desired future condition for this habitat association would be to provide amounts of suitable habitat in the proper stages of succession to ensure that the species dependant on the association have a high probability of persistence on the forest. This would involve maintaining a structured age class distribution with emphasis on maintaining a significant component of mature habitat that contains the habitat modifiers required by various species. This habitat is disturbance dependant and fire would likely be the primary tool to maintain this association.

Because this habitat has been decimated by the recent SPB epidemic the outlook for short-term viability of the habitat association itself is bleak. The SPB impacted mature and mid-aged yellow pine forest to a greater degree than early successional habitat. Therefore species dependant on more mature age classes may be impacted more so than species that utilizes the early successional habitats. Exact figures on the damage are not currently available. Based on the available information it is evident that the majority of the habitat greater than 15 years old has been severely impacted.

The majority of the species that depend on this habitat association may also occur in other habitat associations as well. While this habitat association may be preferred by the species, they can, and do, exist in other habitats that provide the required, but not optimal, conditions. However, other habitats alone may not be able to support the population at the levels that occurred in this association. Three species on the list are considered to be at greatest risk of losing viability on the forest. The RCW, pine warbler and pitch pine are all species considered to be extremely dependent on this association. The ability of these species to persist on the forest, even at lower levels, is in question.

I state with great certainty that the federally endangered RCW has lost the ability to persist on this forest due to SPB impacts in the pine habitat. Recent efforts to rescue the RCW from this situation have been largely successful in moving the remaining birds to suitable habitat in other states. Rescue efforts have given 15 individuals the chance for survival in other locations. This species no longer occurs on the DBNF. The pine warbler may be expected to persist on the forest in the short-term, but will likely occur in much lower numbers due to the pine habitat loss. Small, scattered pockets of mature and mid-aged pine habitat is likely to survive and the pine warbler may utilized this limited habitat to some degree. The extent to which pine warblers will utilize less optimal habitat, such as mixed associations, may determine the long-term persistence of this species on the DBNF. Pitch pine, as with the other yellow pine species, has been heavily impacted by the SPB and as stated earlier, occurred in limited quantities prior to the SPB attack. It is likely that pitch pine has been effectively removed as a dominant species in most of its former habitat. While the SPB has decimated this species the abundance of pitch pine has also declined over the years due to the lack of a cyclic disturbance regime, particularly the presences of fire.

The following recommendations take into consideration the need for restoration of this association for long-term viability. Recommendations for sustaining short-term viability, if

possible, will also be made. Because the SPB threat is still ongoing, there is uncertainty as to the final outcome of the epidemic. However, it is expected that 10 – 20 percent of the habitat will survive. For the purpose of planning, short-term will be considered the next 10 -15 years. Short-term items should be implemented as soon as possible to preserve and manage as much of the habitat as possible. Long-term viability recommendations will consider what is needed to ensure that the habitat and associated species continue to persist on the forest in perpetuity. Long-term items must be considered to fully restore the association to levels that support the affiliated species and to ensure a healthy, sustained habitat association. Long-term items should be implemented as soon as possible but the objectives will likely not be fully achieved in the next 10 – 15 year planning period.

Short-term recommendations

- Maintain all existing occurrences of the Southern Yellow Pine Habitat Association.
 - *Rational: Because of the recent decimation of this habitat, all of the areas that survive the SPB epidemic are considered vital if the associated species are to maintain a level of persistence. Areas of mature and mid-aged forest are of critical importance. Stands younger than 30 years old are also of extreme importance as this represents the areas that will provide mature habitat in the shortest amount of time.*
- Mature, mid-age and young stands of yellow pine that are susceptible to SPB infestation should be thinned to reduce this risk.
 - *Rational: The key is to maintain high radial growth and vigor in immature stands to reduce susceptibility to SPB infestation. High-risk stands are characterized by slow radial growth (Thatcher). Thinning to maintain desirable BA is considered a good method to reduce stand susceptibility to SPB attack. The thinning schedule must be prescribed on a site-specific basis using the best available silviculture to ensure good vigor and growth. Generally, overstocked stands greater than 70 yrs. old should be thinned to a total pine BA of 60 – 80. Younger stands (10 – 30 yrs old) and mid –age stands (31 – 69 yrs. old) should be thinned to a BA of 70 – 90.*
- Use prescribed fire in pine areas and SPB damaged areas to maintain understory conditions in surviving stands and control hardwood regeneration in SPB killed pine areas.
 - *Rational: Prescribed fire use is critical to maintain site conditions in pine-dominated areas that have been decimated by SPB. The periodic use of fire will maintain suitable understory conditions to a limited degree and set back hardwood succession until further restoration efforts can be implemented. It is also important to continue to treat any surviving pine areas with the use of prescribed fire. This will help maintain favorable conditions in the limited amount of remaining habitat. This will afford species linked to this association the best chance for some level of persistence on the forest.*

- Establish a management area that has emphasis on yellow pine management and restoration.
 - *Rational: The HMA currently in the forest plan (USDA Forest Service, 1985) will not be necessary to sustain the RCW or other species in this association. The HMA is species-specific to recovery objectives for the RCW, which no longer exists on the DBNF. In order to sustain and recover this habitat association a management area with special emphasis on yellow pine restoration and the use of prescribed fire may be needed. This will allow planning for the recovery of this habitat association to be focused in suitable sites and ensure the continuity and juxtaposition is provided for species requiring interior conditions.*

Long-term recommendations

- Restore southern yellow pine habitat association impacted by SPB in areas with suitable site conditions.
 - *Rational: Restoration of habitat should be the primary goal for the management of this association. In order to provide habitat for the associated species at reasonable levels, long-term objectives must emphasize this ecosystem in areas with proper site conditions. Areas of sufficient size that provide the necessary habitat components for the species group will be priority. Site conditions such as soil type, aspect, moisture regime, site index, ability to prescribe burn and Landtype association should all play a role in the selection of which areas to concentrate restoration efforts in.*
- Plan restoration efforts to provide for continuity of the habitat for species dependant on large tracts and forest interior.
 - *Rational: Large blocks of this habitat should be restored based on the landscape position of the suitable sites. Symmetrical blocks are typically not possible due to the position this association typically occupies on the landscape. Continuity of habitat can be provided in a linear fashion along ridgetops and connecting ridgelines. Gaps in this habitat are to be expected due to varying site conditions and changes in elevation and aspect that favor other habitat associations (e.g. drainages between ridgelines or north slopes). Gaps, and the size of the gaps, should be dictated by the natural breaks in site conditions and not by artificial management boundaries.*
- Restore 10 - 12 percent of the total forest area to the southern yellow pine habitat association.
 - *Rational: Previous to the SPB epidemic approximately 8 – 9 percent of the forest area was considered within this association. The proposed increase in total area will likely be a result of restoration efforts in the mixed pine-hardwood associations and conversion of some upland sites currently dominated by hardwoods. The use of prescribed fire at the landscape level will favor the development of pine habitat in upland sites currently dominated by fire intolerant species due to years of fire*

suppression. These sites will add to the continuity of the association and provide for species requiring larger tracts of habitat.

- Structure restoration activities to ensure distribution of various age classes that provide for habitat modifiers.
 - *Rational: Restoration activities should allow for distribution of age classes to avoid excessive amounts of young and mid age forest. The standard rotation age for this association should be 120 yrs. for shortleaf and pitch pine. Due to the characteristics of Virginia pine it should be considered for regeneration at 90 yrs. (USDA 1985). These rotation ages will not come into play until it is determined necessary to ensure stand health or to supply the early successional stage in this association. The intentional regeneration of mature stands in this association would not be expected to be necessary within the next 50 yrs. due to restoration of decimated areas. These restoration areas will supply the early stages of succession and move into the mid-age classes in the future. However, regeneration of some stands prior to rotation age may be necessary to balance age classes at some point. A desired future condition for age class distribution should provide approximately 1/3 of the acres in older age classes and the remaining acres in distribution to supply a constant flow into the older age groups. A possible example of this flow is as follows:*

Age Groups	1998	Desired Management
0-10	4.7 percent	6-10 percent
11-30	34.7 percent	20-25 percent
31-80	38.1 percent	34-38 percent
80+	22.6 percent	30-35 percent

The 0 - 10 age group provides the shrubby conditions required by species utilizing the early successional habitats. The 11 - 30 age group provides for species requiring high stem density and developing structure (sapling/pole) in the overstory. The 31 – 80 age group develops well-defined structure for species utilizing the mid-age forest and begins to provide modifiers such as cavities and downed logs. The majority of the species in this association are linked to older age classes. The older age classes provide modifiers such as large trees, open midstory, grassy understory and open areas resulting from downed trees. These modifiers are dependant on proper maintenance of the area as age class progresses. To achieve the older age classes perpetually, the early stages are necessary regardless of their direct benefit to species linked to this association.

- Focus restoration activities on pitch pine in suitable areas.
 - *Rational: Pitch pine should be considered as priority for restoration in areas where the site conditions allow. This species is limited in distribution and is considered a fire dependant species. This species should only be managed for in areas where the use of fire is practical on a regular, long-term basis.*

- Use the most appropriate silviculture methods to re-establish yellow pine habitat during restoration activities.
 - *Rational: Preparation of damaged sites for reforestation may include prescribed burning, mechanical treatment, and salvage harvest. Any method of timber stand improvement (TSI) may be used to ensure the best possible radial growth and vigor is maintained. TSI activities may include mechanical or herbicide treatment to reduce competition from undesirable species.*
- Retain some large downed logs in areas targeted for restoration.
 - *Rational: Reptiles linked to the Southern Yellow Pine Habitat Association utilize large downed logs. Restoration activities have the potential to remove much of the residual debris and care should be taken to ensure this species requirement is met during these activities.*

IV. Management Needs: Monitoring and Inventory to Ensure Species Viability

Monitoring and Inventory of the Southern Yellow Pine Habitat Association will need to be implemented at a level sufficient to provide data to track the current condition of the habitat. This would allow management decisions as to the level of restoration needed to achieve the desired amount and condition of this habitat association. All monitoring and inventory recommended for the General Forest Habitat Association apply to this association. Within this association it may be necessary to monitor some species that are directly related to this habitat. This species specific monitoring will further support the analysis of the sustainability of the association. The following items are considered necessary to ensure that the association can be properly evaluated and decisions supported.

- Inventory should be conducted in each stand (or analysis unit) at least once every 10 – 15 years. (High priority)
 - *Rational: Inventory to identify and update baseline data or assess changed conditions after non-prescribed major disturbances. Inventory may be at the stand level or larger units may be used (such as ecological or habitat units) as long as the data is sufficient to assess the required parameters. Current data from past inventory work may need to be supplemented to include additional habitat modifier data. This inventory may be part of the prescription process but should not be limited to project planning efforts.*
- Employ GIS and vegetation management databases to track the condition and composition of the yellow pine habitat association. (High priority)
 - *Rational: The use of FSVeg (or CISC currently) in concert with our GIS coverage of stands should be adequate to assess the composition, age class and spatial distribution of the pine habitat and habitat modifiers. This makes the assumption that the inventory data collects the necessary information regarding habitat modifiers and the data is entered in a timely fashion.*

- Annual monitoring reports should include an analysis of the southern yellow pine habitat association using the latest inventory data. (High priority)
 - *Rational: This annual check of the conditions of the habitat association will help ensure that any potential management problems regarding the composition, age class structure or habitat modifiers of the association are readily identified. This info should be displayed using the most up to date GIS coverage.*
- Monitor prescribed fire use to determine changes effected in this association. (High priority)
 - *Rational: Information concerning pre-burn and post-burn condition should be monitored as part of the requirements for the use of prescribed fire. This may be accomplished by any logical method such as photo points or vegetation plot sampling. The objective is to monitor both short-term and long-term changes in the site conditions resulting primarily from the disturbance of prescribed fire.*
- Inventory stands currently identified as containing pitch pine and monitoring the condition of these stands. (Medium priority)
 - *Rational: Pitch pine forest types are limited on this forest and should be of high concern for persistence. Pitch pine stands should be monitored to track the persistence of this species on the DBNF. Current CISC data will need to be updated to reflect the current condition of the pitch pine stands.*
- Continue to implement R8 landbird monitoring program. (Medium priority)
 - *Rational: This monitoring program will help track the persistence of pine warbler and other species dependant on the yellow pine habitat association. This may be a critical element in documenting the changes in species composition that are expected to occur as a result of SPB damage. Because this monitoring program contains points linked to this association it would be considered an excellent tool for both species-specific and association monitoring.*

References:

- Burns, Russell M., and Barbara H. Honkala, tech. Cords. 1990. Silvics of North America: Vol. 1. Conifers. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service. Washington, DC.
- Martin, W.H. 1991. The Role and History of Fire in the Daniel Boone National Forest. Division of Natural Areas, Eastern Kentucky University. Richmond KY. 131 p.
- Thatcher, R.C., J.L. Searcy, J.E. Coster, and G.D. Hertel. ????. The Southern Pine Beetle. Technical Bulletin 1631. USDA Forest Service, Expanded Southern Pine Beetle Research and Applications Program, Atlanta, GA.

07/15/2003

USDA Forest Service, 1985. Land and Resource Management Plan Daniel Boone National Forest. USDA Forest Service, Southern Region, Winchester, KY.

USDA Forest Service. 1997. Landtype association map unit descriptions. Unpublished white paper. U.S. Department of Agriculture, Forest Service, Daniel Boone National Forest. Winchester, KY.

USDA Forest Service. 1998. Continuous inventory of stand condition (CISC). Unpublished data. U.S. Department of Agriculture, Forest Service, Daniel Boone National Forest. Winchester, KY.

Attachment A.

Species List: Southern Yellow Pine Habitat Association

Class	Common Name/Species
ANIMALS	
Birds	Sharp-shinned Hawk/ <i>Accipiter striatus</i> Bachman's Sparrow/ <i>Aimophila aestivalis</i> Chuck-will's Widow/ <i>Caprimulgus carolinensis</i> Prairie Warbler/ <i>Dendroica discolor</i> Yellow-throated Warbler/ <i>Dendroica dominica</i> Blackburnian Warbler/ <i>Dendroica fusca</i> Pine Warbler/ <i>Dendroica pinus</i> Red-headed Woodpecker/ <i>Melanerpes erythrocephalus</i> Red-cockaded Woodpecker/ <i>Picoides borealis</i> Summer Tanager/ <i>Piranga rubra</i> Red-breasted Nuthatch/ <i>Sitta canadensis</i>
Reptiles	Southern Five-lined Skink/ <i>Eumeces inexpectatus</i> Eastern Slender Glass Lizard/ <i>Ophisaurus attenuatus longicaudus</i> Northern Pine Snake/ <i>Pituophis melanoleucus melanoleucus</i> Southeastern Crowned Snake/ <i>Tantilla coronata</i>
LICHENS	Reindeer Lichen/ <i>Cladina</i> spp. (cf. <i>rangiferina</i> , <i>subtenuis</i>)
PLANTS	
Dicots	Monkshood/ <i>Aconitum uncinatum</i> (generic) Eastern Silvery Aster/ <i>Aster concolor</i> Box Huckleberry/ <i>Gaylussacia brachycera</i> St. Peter's-wort/ <i>Hypericum crux-andreae</i> Cross-leaf Milkwort/ <i>Polygala cruciata</i> var. <i>cruciata</i> Racemed Milkwort/ <i>Polygala polygama</i> var. <i>polygama</i> Hairy Snout Bean/ <i>Rhynchosia tomentosa</i> Slender Marsh-pink/ <i>Sabatia campanulata</i> American Chaffseed/ <i>Schwalbea americana</i> Spiked Hoary-pea/ <i>Tephrosia spicata</i>
Gymnosperms	Pitch Pine/ <i>Pinus rigida</i>
Liverworts	Liverwort/ <i>Nowellia curvifolia</i>
Monocots	Grass-pink/ <i>Calopogon tuberosus</i> Appalachian Spreading Pogonia/ <i>Cleistis bifaria</i> Pink Lady-slipper/ <i>Cypripedium acaule</i> Bearded Skeleton Grass/ <i>Gymnopogon ambiguus</i>

07/15/2003

Class

Common Name/Species

Yellow-crested Orchid/ *Platanthera cristata*

Globe Beaked-rush/ *Rhynchospora globularis* var. *globularis*

Fringed Nut-rush/ *Scleria ciliata* var. *ciliata*

Yellow-eyed Grass/ *Xyris caroliniana*

Yellow-eyed Grass/ *Xyris torta*

Attachment B.

Southern Yellow Pine Species/Habitat Relationships with References

ANIMALS

Birds

Sharp-shinned Hawk – *Accipiter striatus* – Throughout the year, sharp-shinned hawks utilize pine species. Although they are known to nest in hardwoods, birds in Kentucky seem to prefer evergreens for nesting and over-wintering. A large, mature pine is a typical nesting site, provided it is within an extensive tract of forest and therefore, they would be attracted to southern yellow pine forests for nesting. Planting of pine in various areas in the state has increased nesting sites for the species, as seen in central and western regions where pine habitat had been lacking (Palmer-Ball 1996). Although sharp-shinned hawks are observed (particularly when foraging) in areas having a mix of forested and semi-open habitat, they more frequently occur in forested tracts and are considered forest interior birds.

Bachman's Sparrow – *Aimophila aestivalis* – This species typically requires dense grassy places where scattered trees or saplings are present, usually in pine forests (Hamel, 1992). Historically found in mature to old growth southern pine woodlands subject to frequent growing-season fires (NatureServe, 2001). This provided the grassy undergrowth require by this species. This species formerly inhabited a variety of early successional habitats in KY (Palmer-Ball, 1996). The Bachman's sparrow would be attracted to the southern yellow pine forests where those forests have been frequently burned and have a grassy understory.

Chuck-will's Widow – *Caprimulgus carolinensis* – This species tends to favor mixed oak and pine stands (DeGraaf et. al., 1991). It may occur and breed in general woods and forests that are primarily dry or mesic (Hamel, 1992). It appears to be much more common in drier forest where the understory and midstory levels are relatively open (Palmer-Ball, 1996). It typically feeds over adjacent fields and clearings (Hamel, 1992). The dry conditions and open understory most commonly associated with a healthy southern yellow pine forest would be preferred by this species.

Prairie Warbler – *Dendroica discolor* – Prairie warblers occur in semi-open, early successional, and woodland habitats. Mixed forest types—especially those that have been cut-over or burned--with pines and cedars are occupied. Forest edges, clearings, brushy borders, and overgrown fields with scattered saplings or small trees are commonly used. On the DBNF, the birds are nearly always found in early successional habitat, especially young clearcuts and the undergrowth of shelterwood cuts, and often at wood edges and in stands that have been burned (L. Perry, pers. obs.).

Yellow-throated Warbler – *Dendroica dominica* – In some areas, hardwood-pine is used; however, birds on the Cumberland Plateau show a preference for pine (Mengel 1965) and a southern yellow pine forest would offer good habitat for this species. Sites may range from moderately moist to dry/upland, provided the stands are rather open and have large trees (> 20" dbh). On the DBNF, the birds are frequently observed in mature pine trees, and almost always

observed in or near pines; they are frequently seen in stands with open canopies (L. Perry, pers. obs.).

Blackburnian Warbler – *Dendroica fusca* – The blackburnian warbler has a slight preference for forests of hardwoods mixed with hemlocks, spruce and fir (Hamel 1992). On the DBNF, this species has only been encountered during periods of migration and would not be expected to breed on the DBNF except in areas where elevations are greater than 3500', of which there are few of. This is a forest interior species of higher elevations, with most of the birds that are recorded in the Cumberland and Southern Appalachians occurring above 3500 feet (Hamel, 1992). A variety of coniferous and mixed forest types are utilized, with deciduous habitat being used to a greater extent in this southern part of the breeding range (DeGraaf et. al., 1991). Extensive tracts of mature forest, with large (> 20" dbh) nesting trees, are required (Hamel, 1992). The blackburnian warbler may be attracted to the evergreen component of southern yellow pine stands during migration.

Pine Warbler – *Dendroica pinus* – Pine warbler habitat consists of open to fairly dense stands of yellow pine and pine-hardwood. Although most numerous in extensive pine stands, the birds will use small stands of pine, as well (Mengel 1965). Suppression of fire has contributed to reduction of pine in some areas (Palmer-Ball, 1996). Both middle-aged and mature stands are used; however, nesting is usually in mature pines.

Red-headed Woodpecker – *Melanerpes erythrocephalus* – Semi-open to open habitat with an abundance of large (> 14" dbh), dead trees is preferred for both breeding and wintering purposes. Relatively open, mature woods, swamps, clearings within mixed woodland, forest edges, and places where groves of trees are present, such as park-like settings, are commonly used. On the DBNF, the birds are often observed in pine-dominated stands that have been frequently burned (L. Perry, pers. obs.). Nesting is in dead trees, or in dead limbs of live trees (Mengel 1965). This species generally avoids mature closed canopy forest during the breeding season (Palmer-Ball, 1996).

Red-cockaded Woodpecker – *Picoides borealis* – Habitat for this species is generally thought of as being primarily open pine woods. Habitat is generally fairly forest with little or no midstory. The birds prefer conditions of minimal understory (Hamel, 1992). It is likely that the red-cockaded woodpecker used forests that were maintained by natural fires (Palmer-Ball, 1996). On the DBNF this species seems to be attracted to open, frequently burned pine dominated stands where it selects live mature pine trees for nesting (L. Perry, pers. observation). These stands contain cavity trees that typically range in age from 90 to 128 years old and have an average diameter at breast height of 14.2-18.9 inches (Murphy, 1980). Due to southern pine beetle impacts to the primary habitat of this species, all known individuals on the DBNF have been relocated out of state to suitable habitat in other populations.

Summer Tanager – *Piranga rubra* – Relatively dry sites, which tend to produce stands of a semi-open condition, are frequented by this species. Uplands are commonly used, but the birds may occur in a variety of habitats, including bottomlands and wooded residential areas. Forest types range from hardwood to pine-hardwood stands of open to medium density. On the DBNF, the birds are frequently found in mature, mixed pine stands that have been burned and undergone

midstory removal (L. Perry, pers. obs.). Oaks are often chosen for nesting, in open woodland or forest edge and often over open spaces such as roads and clearings (Mengel 1965). The summer tanager would be particularly attracted to the open, dry conditions generally found in healthy southern yellow pine stands.

Red-breasted Nuthatch – *Sitta Canadensis* – Though this nuthatch is dependent on coniferous habitat, its requirements vary considerably between seasons. It generally breeds at elevations above 3500 feet, in dead spruce or fir trees. Occasionally it will nest in hemlock and, rarely, in pine. Suitable snags (dead trees) are greater than 6" dbh (six inch diameter at breast height). Mature stands are favored. The red-breasted nuthatch prefers to overwinter in dense stands of conifers and pine-oak and frequents the southern yellow pine forest during the winter. During that time, the birds are not particular to age class so much as to stand density. On the DBNF, when these birds are encountered in winter, it is almost always while feeding in pines—especially mature Virginia pines having a lot of cones (L. Perry, pers. obs.).

REPTILES

Southern Five-lined Skink – *Eumeces inexpectatus* – The southern five-lined skink ranges from Virginia south to the Florida keys, and westward to the Mississippi River. This skink is most abundant in dry habitats, such as pine clearings, beaches, ridge tops and well-drained, sandy places. This species has been documented around man-made structures, field and wood edges, urban woodlots, dry pine forests, mixed pine-hardwood forests, early stages of lowland pine communities and sawdust piles. (Virginia website.) This skink is considered terrestrial and arboreal. The southeastern five-lined skink diet consists of a variety of arthropods. (Wilson, 1995)

Eastern Slender Glass Lizard – *Ophisaurus attenuatus longicaudus* – This is a species of dry, often sandy, soil conditions. It occurs in relatively open, typically upland, habitats--including Virginia and Shortleaf Pine and pine-oak stands, forest edges, grassy fields and prairies--which have loose, friable soils. This secretive, legless lizard tends to stay in old rodent burrows and under mats of dead grass and decomposing plants; when it basks in the sun, it is often hidden in tall grass or with only part of its body showing (VA Dept. of Game and Inland Fisheries 2001). Slender Glass Lizard diets include insects, spiders, birds' eggs, smaller lizards, and snakes. Prescribed burning and other management practices that help to create open canopy conditions benefit this lizard species.

Northern Pine Snake – *Pituophis melanoleucus melanoleucus* – Pine Snakes inhabit dry, sandy pine and pine-oak forest types with open canopies and patchy to dense ground cover. Eastern KY sites are typically upland or ridgetop; whereas, at lower elevations the snakes utilize pine flatwoods and sandhill areas. Forest openings with scattered areas of well-drained sand and little shrub cover are required for nesting and hibernation sites (NatureServe 2001). These secretive snakes spend much of their time in burrows, emerging to hunt for small mammals, birds and eggs; they climb trees well. Loose or friable soil is needed, since the snakes excavate their own burrows as well as use those made by small mammals. This species requires a relatively large area in which to forage (Wilson 1995). Management practices, including midstory control and prescribed burning, which serve to promote and maintain barrens-like conditions—open stands with well-lit, grassy understories—are necessary to support the species.

Southeastern Crowned Snake – *Tantilla coronata* – The southeastern crowned snake ranges from south-central Virginia and southern Illinois to the Florida panhandle and eastern Louisiana. This secretive snake is an excellent burrower, spending much of its time concealed in rotting logs, under bark, stones, leaf litter, pine needles, or burrowed in the soil. The southeastern crowned snake apparently prefers relatively xeric, well-drained soils in pine flatwoods, sandhills and dry hillsides. This snake requires dry habitats with friable soil and sufficient debris for shelter. Females deposit eggs in rotting logs or sawdust piles. The southeastern crowned snake's diet consists of centipedes, spiders, termites, and other small, soft-bodied arthropods. (Wilson, 1995).

PLANTS

Dicots

Monkshood – *Aconitum uncinatum* (generic) – on the DBNF belongs to the subspecies *uncinatum*. Species-habitat relationships are discussed for this subspecies in other habitat associations.

Eastern Silvery Aster – *Aster concolor* – is a coastal plain species where it is found in pine savannas. On the DBNF, it is found in open yellow pine or yellow pine-oak forest that has a sparse midstory and a grass-forb ground layer. It is also found in and at the edge of warm season grassland areas, including powerline rights-of-way. It requires high light conditions and benefits from the application of fire to its habitat.

Box Huckleberry – *Gaylussaccia brachycera* – is a central Appalachian species. It occurs in upland yellow pine and yellow pine-oak woods. Yellow pine is present in or adjacent to all sites on the DBNF. It is also found on sandstone glades and in the upland portions of utility rights-of-way. The species appears to require well-drained, sandy soils. *Gaylussaccia* will grow in closed canopy (yellow pine) conditions if the midstory and shrub layers are more or less absent. On the DBNF, the densest, and apparently the healthiest populations, are found in these sites. It also grows under more open canopy conditions where it is tolerant of thicker midstory and shrub layers. The rhizomes are positioned at the transition between the duff and mineral soil. Fire maintains the general habitat in which it grows. The species is top killed by fire, but does resprout, at least if the duff layer is not removed. Recovery appears to be slower than for other

Gaylussacia species or *Vaccinium* species, but with the proper interval and intensity of fire, populations should be maintained while enhancing habitat.

St. Peter's-wort – *Hypericum crux-andreae* – is a coastal plain species with scattered populations in the interior. The species grows on usually damp sandy soil, in roadside ditches, and in open, wet yellow pine forest. On the DBNF, it occurs in open, wet warm season grassland. These sites were likely forested, but open prior to their current condition.

Cross-leaf Milkwort – *Polygala cruciata* var. *cruciata* – is coastal plain species with inland records along the Appalachian Plateaus and in midwestern prairie states. It is known from damp to wet meadows, yellow pine savannas, and bogs. On the DBNF, it is known from wet meadows and open, wet non-forested areas such as warm season grassland.

Racemed Milkwort – *Polygala polygama* var. *polygama* – has a midwestern and coastal plain distribution. It is usually found on dry, sandy soil in open forest or grassland. The DBNF sites are on sandy soil in open, ridge top, yellow pine-oak forest or sandy, grassy openings.

Hairy Snout Bean – *Rhynchosia tomentosa* (var. *tomentosa*) – is found throughout most of the southeastern US. It grows in dry, open, often sandy, oak or yellow pine forest, at forest margins, in sandhills, and occasionally in mesic forest. The DBNF sites are all in warm season grassland, or low disturbed vegetation along roads or under powerline rights-of-way.

Slender Marsh-pink – *Sabatia campanulata* – is coastal plain species found in salt or brackish marshes. It occurs inland in a few areas. The DBNF sites are from wet meadows.

American Chaffseed – *Schwalbea americana* – occurs in two general kinds of habitats, wet and dry. In all cases, soils are sandy and somewhat sterile. In wet habitats, the combination of constant water and periodic fire maintain the site in an open condition. The overstory is open as are the midstory and shrub layers beneath it. Generally wet sites are grassy with few shrubs. Periodic fire helps to maintain the open condition of the sites. It also plays a role in triggering flowering. This habitat type is not known from the DBNF. Dry habitats likewise are open with a thin overstory and open midstory and shrub layers. These sites are generally a mixture of forbs, grasses, and low shrubs. Some dry habitats are subjected to periodic burns, which help to maintain the open condition. Fire here also helps to trigger flowering. In other dry habitats, the openness is more edaphically controlled. The historic sites on the DBNF fall into this group. Here fire would have triggered flowering. Other dry DBNF sites could, with periodic fire, support *Schwalbea* populations.

Spiked Hoary-pea – *Tephrosia spicata* – is a southern species with a number of more northern stations. It is commonly found in dry to wet, open yellow pine or yellow pine-hardwood forest, roadsides, clearings and fields. On the DBNF, the species is found on boulder/cobble bars along larger streams and rivers of the Cumberland River drainage. A few sites are known from sandy, sparsely shaded openings on ridges.

Gymnosperms

Pitch Pine – *Pinus rigida* – ranges from New England to the Appalachian Mountains. It grows in generally sterile, sandy soil where it competes well against many other woody species. These

soils are usually dry, but may be moist. The cones are semi-serotinous, opening following hot fires or occasionally very hot days. Fire also prepares a seedbed advantageous to the light seeds. On the Daniel Boone NF, this species is most commonly found within a few hundred feet of sandstone cliffs. The soils here are sandy, thin and usually dry providing the conditions under which the species competes. These areas also would have been subject to periodic burning, aiding regeneration of the species.

Liverworts

Liverwort – *Nowellia curvifolia* – is widespread in northern North America, south into the Appalachian provinces, present in the high mountains of Mexico and Central America. It is found almost exclusively on decorticated logs. On the DBNF, it is found almost exclusively on decorticated eastern hemlock and yellow pine logs, usually of 10-12 inch diameter or larger. It requires moderate to heavy shade.

Monocots

Grass-pink – *Calopogon tuberosus* – is a coastal plain species found in wet to moist pine savannas, roadside ditches, pitcher plant bogs, and other open, wetland habitats. A few historic Kentucky stations occurred in dry, sandy soil on ridgetops under open oak or oak-yellow pine forest. On the DBNF, a few extant stations are known from streamhead wetlands, slope seeps or wet warm season grassland. It may have occurred on drier sites in the past. The species requires constant moisture and more or less open conditions.

Appalachian Spreading Pogonia – *Cleistes bifaria* – ranges from the Appalachian Plateaus to the Piedmont. It is found in a variety of sites ranging from glades to open forest to warm season grassland to streamhead wetlands. It occurs on well-drained substrates (on hummocks in wetlands) usually in open or partially open conditions. The plants can be single or occur in colonies. On the DBNF, it is known from glades, streamhead wetlands, seep slopes, and on road cuts in upland oak forest. Fire enhances flowering and total numbers of plants. Fire probably helps to maintain habitat as well.

Pink Lady's-slipper – *Cypripedium acaule* – across its range occurs in acid forests or wetlands (usually sphagnum bogs). On the DBNF, pink lady-slipper is found in upland oak and mixed pine-oak woods, and occasionally on hummocks within seeps and streamhead wetlands. It occurs in light to heavy shade, but does not seem to flower unless in somewhat open conditions. This species responds well to burning. It is not uncommon to find 3-4 dozen plants in flower and as many more in vegetation condition following a fire where only a dozen or so were found before. The species is experiencing collection pressure from root diggers. Digging of this species is not permitted on the DBNF.

Bearded Skeleton Grass – *Gymnopogon ambiguous* – is a coastal plain species that generally occurs in dry, sandy, open forest. It may also occur in open grassland. On the DBNF, it occurs in open warm season grassland and open, sandy ground with or without light forest cover.

Yellow-crested Orchid – *Platanthera cristata* – occurs in a wide variety of habitats across its range. On the DBNF, it occurs in streamhead wetlands, seeps, and in permanently damp to wet areas in warm season grassland. It occurs in low to moderate shade conditions. This species is an

alternative host to the endophyte fungus that is the sole fungal associate for white fringeless orchid (*P. integrilabia*). Maintaining this orchid helps to maintain a diverse stock for the fungal symbiont

Globe Beaked-rush – *Rhynchospora globularis* var. *globularis* – is a coastal plain species with stations in the interior. It commonly occurs on wet sand and in swamps and bogs, either in the open or under open canopy. The DBNF populations occur in wet open, usually sandy areas in warm season grassland or disturbed ground.

Fringed Nut-rush – *Scleria ciliata* var. *ciliata* – is a coastal plain species with stations inward to Missouri and Kentucky. It commonly is found in damp, sandy soil of open areas, grasslands, and open, yellow pine or yellow pine-oak forests. In the DBNF area, the sites for this species are all on boulder/cobble bars of rivers in the Cumberland River drainage (McCreary County). The bars are subject to flooding and scouring, which keeps sand on the site, and maintains open conditions.

Yellow-eyed Grass – *Xyris caroliniana* – is not found in the state. It is a misidentification which has been tracked erroneously. The specimens are referable to *X. torta* (Medley, 1993)

Yellow-eyed Grass – *Xyris torta* – is a coastal plain and lake state species found in bogs and wet, sandy soil of open yellow pine forest and grasslands. The DBNF records are from streamhead wetlands, slope seeps, and wet warm season grasslands and meadows.

LICHENS

Reindeer Lichens – *Cladina* spp (cf. *rangiferina*, *subtenuis*) – are widespread in North America, forming the primary ‘vegetation’ in some parts of the tundra. These symbiont organisms are usually found on harsh sites, often dry and sterile. On the DBNF, they are most common on the thin soils of sandstone or conglomerate glades. They may also occur on bare rock or on woody material on the glades. The sites are usually open with little canopy. These lichens do not seem to grow under shrubs or dense tree growth. They are sometimes found on soils that were exposed to high heat during fire events.

References:

- Barbour R.W. 1971. Amphibians and reptiles of Kentucky. The University Press of Kentucky. Lexington, KY.
- Behler, J.L. and F.W. King. 1979. The Audubon Society field guide to North American reptiles and amphibians. Alfred A. Knopf, New York.
- Conant, R. and J.T. Collins. 1991. Peterson field guide to reptiles and amphibians: eastern and central North America. 3rd ed. Houghton Mifflin. Boston, MA.
- DeGraaf, R.M., V.E. Scott, R.H. Hamre, L. Ernst, and S.H. Anderson. 1991. Forest and Rangeland Birds of the United States: natural history and habitat use. U.S. Department of Agriculture Handbook 688. 625 pp.

- Hamel, Paul B. 1992. Land manager's guide to birds of the South. The Nature Conservancy, Southeastern Region. Chapel Hill, NC. 437 pp.
- Mengel, R.M. 1965. The birds of Kentucky. Ornithological Monographs No. 3, The American Ornithologists' Union. The Allen Press. Lawrence, KS. 581 pp.
- Murphy, G.A. 1980. Status, nesting habitat, foraging ecology, and home range of the Red-cockaded Woodpecker (*Picoides borealis*) in Kentucky. Unpublished Masters thesis. Eastern Kentucky University. Richmond, KY.
- NatureServe: An online encyclopedia of life [web application]. 2001. Version 1.4. Association for Biodiversity Information, Arlington, VA. Available: <http://www.natureserve.org/>. Accessed: July 25, 2001.
- Palmer-Ball, B.L. 1996. The Kentucky Breeding Bird Atlas. The University Press of Kentucky. Lexington, KY. 372 pp.
- Perry, L. Wildlife Biologist. USDA Forest Service, Daniel Boone National Forest, Stearns Ranger District. Personal Observations.
- Storm Damage DEIS
- VA Department of Game and Inland Fisheries: VA Fish and Wildlife Information Service. 2001. Available: <http://www.dgif.state.va.us/>. Accessed July 26, 2001.
- Wilson, L.A. 1995. Land manager's guide to the amphibians and reptiles of the South. The Nature Conservancy, Southeastern Region. Chapel Hill, NC; and the U.S. Department of Agriculture, Forest Service, Southern Region. Atlanta, GA.

07/15/2003

Attachment C.

Southern Yellow Pine Habitat Association Matrix

Association	Habitat	Modifier	Class	Common/Species
9-S. Yel. Pine	Southern Yellow Pine Forest	(blank)	BIRD	Chuck-will's widow/ <i>Caprimulgus carolinensis</i>
				Red-breasted Nuthatch/ <i>Sitta canadensis</i>
				Red-cockaded Woodpecker/ <i>Picoides borealis</i>
			P-DIC	Hairy Snout Bean/ <i>Rhynchosia tomentosa</i>
			P-MON	Globe Beaked-rush/ <i>Rhynchospora globularis</i> var. <i>globularis</i>
		Acidic Substrate	P-DIC	Racemed Milkwort/ <i>Polygala polygama</i> var. <i>polygama</i>
		Aspect (SE to NW)	P-GYM	Pitch Pine/ <i>Pinus rigida</i>
		Burrows, Holes, Tunnels (Secondary Users)	REPT	Eastern Slender Glass Lizard/ <i>Ophisaurus attenuatus longicaudus</i>
				Northern Pine Snake/ <i>Pituophis melanoleucus melanoleucus</i>
		Downed Logs		Southeastern Crowned Snake/ <i>Tantilla coronata</i>
				Southern Five-lined Skink/ <i>Eumeces inexpectatus</i>
		Downed Logs (minimum size)	P-LIV	Liverwort/ <i>Nowellia curvifolia</i>
		Drainage Good	REPT	Southern Five-lined Skink/ <i>Eumeces inexpectatus</i>
		Dry	BIRD	Chuck-will's widow/ <i>Caprimulgus carolinensis</i>
				Summer tanager/ <i>Piranga rubra</i>
			P-DIC	Eastern Silvery Aster/ <i>Aster concolor</i>
				Spiked Hoary-pea/ <i>Tephrosia spicata</i>
			P-MON	Bearded Skeleton Grass/ <i>Gymnopogon ambiguus</i>
				Pink Lady-slipper/ <i>Cypripedium acaule</i>
			REPT	Southeastern Crowned Snake/ <i>Tantilla coronata</i>
		Elevation (above 2300 ft)	BIRD	Blackburnian warbler/ <i>Dendroica fusca</i>
				Red-breasted Nuthatch/ <i>Sitta canadensis</i>
		Fire Dependent		Red-cockaded Woodpecker/ <i>Picoides borealis</i>
		Fire Tolerant/Enhanced		Bachman's Sparrow/ <i>Aimophila aestivalis</i>
				Pine warbler/ <i>Dendroica pinus</i>
				Red-cockaded Woodpecker/ <i>Picoides borealis</i>
				Red-headed woodpecker/ <i>Melanerpes erythrocephalus</i>
		Forb/Grass Condition		Bachman's Sparrow/ <i>Aimophila aestivalis</i>
			P-DIC	Racemed Milkwort/ <i>Polygala polygama</i> var. <i>polygama</i>
		Forest Interior (Minimal Edge)	BIRD	Blackburnian warbler/ <i>Dendroica fusca</i>
				Cerulean Warbler/ <i>Dendroica caerulea</i>
				Sharp-shinned Hawk/ <i>Accipiter striatus</i>
				Yellow-throated Warbler/ <i>Dendroica dominica</i>
		Large Decadent Trees		Red-cockaded Woodpecker/ <i>Picoides borealis</i>
				Sharp-shinned Hawk/ <i>Accipiter striatus</i>
				Yellow-throated Warbler/ <i>Dendroica dominica</i>
		Leaf Litter	REPT	Eastern Slender Glass Lizard/ <i>Ophisaurus attenuatus longicaudus</i>

07/15/2003

<u>Association</u>	<u>Habitat</u>	<u>Modifier</u>	<u>Class</u>	<u>Common/Species</u>
				Southern Five-lined Skink/ Eumeces inexpectatus
		Mature forest	BIRD	Blackburnian warbler/ Dendroica fusca
				Cerulean Warbler/ Dendroica caerulea
				Pine warbler/ Dendroica pinus
				Red-breasted Nuthatch/ Sitta canadensis
				Red-cockaded Woodpecker/ Picoides borealis
				Sharp-shinned Hawk/ Accipter striatus
				Yellow-throated Warbler/ Dendroica dominica
		Mid-age Forest		Pine warbler/ Dendroica pinus
		Moist	P-DIC	Slender Marsh-pink/ Sabatia campanulata
			P-MON	Fringed Nut-rush/ Scleria ciliata var. ciliata
				Grass-pink/ Calopogon tuberosus
				Yellow-crested Orchid/ Platanthera cristata
				Yellow-eyed Grass/ Xyris caroliniana
		Old Growth Condition	BIRD	Red-cockaded Woodpecker/ Picoides borealis
		Open (Little or No Shade)		Summer tanager/ Piranga rubra
			P-LICH	Reindeer Lichen/ Cladina spp (cf. rangiferina, stellaris, subtenuis)
		Open Forest Canopy	BIRD	Pine warbler/ Dendroica pinus
				Summer tanager/ Piranga rubra
				Yellow-throated Warbler/ Dendroica dominica
			P-DIC	Cross-leaf Milkwort/ Polygala cruciata var. cruciata
				St. Peter's-wort/ Hypericum crux-andreae
			P-MON	Appalachian Spreading Pogonia/ Cleistes bifaria
				Globe Beaked-rush/ Rhynchospora globularis var. globularis
				Grass-pink/ Calopogon tuberosus
		Open Midstory/Understory	BIRD	Bachman's Sparrow/ Aimophila aestivalis
				Cerulean Warbler/ Dendroica caerulea
				Chuck-will's widow/ Caprimulgus carolinensis
				Red-cockaded Woodpecker/ Picoides borealis
			P-DIC	Box Huckleberry/ Gaylussacia brachycera
			P-MON	Appalachian Spreading Pogonia/ Cleistes bifaria
			REPT	Northern Pine Snake/ Pituophis melanoleucus melanoleucus
		Riparian		Eastern Slender Glass Lizard/ Ophisaurus attenuatus longicaudus
		Rocky/Rocks	P-GYM	Pitch Pine/ Pinus rigida
			REPT	Northern Pine Snake/ Pituophis melanoleucus melanoleucus
				Southeastern Crowned Snake/ Tantilla coronata
				Southern Five-lined Skink/ Eumeces inexpectatus
		Sandy Soil	P-DIC	American Chaffseed/ Schwalbea americana
				Eastern Silvery Aster/ Aster concolor
				Monkshood/ Aconitum uncinatum (generic)
				Slender Marsh-pink/ Sabatia campanulata
			P-GYM	Pitch Pine/ Pinus rigida
			P-LICH	Reindeer Lichen/ Cladina spp (cf. rangiferina, stellaris, subtenuis)
			P-MON	Fringed Nut-rush/ Scleria ciliata var. ciliata

07/15/2003

<u>Association</u>	<u>Habitat</u>	<u>Modifier</u>	<u>Class</u>	<u>Common/Species</u>
				Grass-pink/ Calopogon tuberosus
			REPT	Northern Pine Snake/ Pituophis melanoleucus melanoleucus
				Southern Five-lined Skink/ Eumeces inexpectatus
		Seep/Constant Water	P-DIC	Cross-leaf Milkwort/ Polygala cruciata var. cruciata
			P-MON	Globe Beaked-rush/ Rhynchospora globularis var. globularis
		Shrub/Sapling Condition	REPT	Southern Five-lined Skink/ Eumeces inexpectatus
		Sphagnum Associate	P-MON	Grass-pink/ Calopogon tuberosus
		Tract Size (Area Sensitive)	BIRD	Cerulean Warbler/ Dendroica caerulea
				Pine warbler/ Dendroica pinus
				Yellow-throated Warbler/ Dendroica dominica
		Tree and Snags (Cavity Nesters)		Red-cockaded Woodpecker/ Picoides borealis
				Red-headed woodpecker/ Melanerpes erythrocephalus
		Trees > 20" dbh		Blackburnian warbler/ Dendroica fusca
				Cerulean Warbler/ Dendroica caerulea
				Red-cockaded Woodpecker/ Picoides borealis
				Yellow-throated Warbler/ Dendroica dominica
		Upland (usually mesic to dry, not subject to holding water)		Yellow-throated Warbler/ Dendroica dominica